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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/928,358      | 08/14/2001  | Yasuhiro Nunomura    | 57454-206           | 6431             |

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| EXAMINER |
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FLEMING, FRITZ M

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| ART UNIT | PAPER NUMBER |
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2182

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/928,358

Applicant(s)

NUNOMURA

Examiner

Fritz M Fleming

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

  
FRITZ FLEMING  
PRIMARY EXAMINER  
GROUP 2100

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) ✓
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 08/14/2001.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Specification***

1. The disclosure is objected to because of the following informalities: Things such as "speeding of devices" and "been said profusely" on page 1 need correction. Page 2 line 15 "cock control" is obviously in error. The page 10 description of S34 appears to wrongly discuss the first processor while Figure 9 shows the second processor 12. The entire specification should be reviewed for any other items of informality.

Appropriate correction is required.

### ***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the Figure 6 and 8 configurations must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering

of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1,9,10,18 are rejected under 35 U.S.C. 102(b) as being anticipated  
Tatsuhiko, as supplied by applicants JP05-028116 by.

Claim 1 requires two processors (i.e. P1-P3), and a clock frequency control circuit (i.e.

2) such that the frequency set at each processor is a function of a ratio of the processing times represented by the counts. The counts are taken as the processing times, with more counts being more processing time, with the example given per Figure 2. At t0-1, the frequencies are the same, with an equal ratio. At t1, the counts are compared so as to adjust clock frequencies based on ratios of the processing times. At t1, the count for ON1 is 3, ON2 is 0 and ON3 is 1. Thus the ratios are 3/0, and 3/1 related to ON1. Accordingly, the clock frequencies are then adjusted at t1 so that the first frequency is doubled, the second frequency is halved, and the third frequency stays the same. The process continues at t1-t2, with a new adjustment at t2.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 2-8 and 11-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tatsuhiko in view of Mizuno.

Tatsuhiko lacks the estimation, prediction and voltage control.

Mizuno in the same field of endeavor teaches the following. When a load is small, the clock frequency is decreased and the DC supply is decreased. When a load is great, the clock frequency is increased and the DC supply is increased. [0045] and beyond teach the concept of predicting or estimating when a process will be finished by determining the processing load by the FIFO 105 observation. The more data in the FIFO the heavier the load and hence the more processing time that would be needed if the clock and power were not to be increased. Hence this would be indicative of a longer processing time, compared to less data in the FIFO meaning a lighter processing

load and a shorter time. Thus the more lightly loaded processor would finish first and hence has its frequency decreased. The more highly loaded processor would finish later, and thus have its clock frequency increased. Thus the frequency is changed based upon the processing time estimates (i.e. a predicted or actual processing time completed first results in a lowered frequency meaning the more lightly loaded processor and a raising of the frequency of the more highly loaded processor meaning that the highly loaded processor finishes after the lightly loaded one). As such, the FIFO is used to predict which will complete processing first, with the frequencies and voltages adjusted accordingly.

Therefore it would have been obvious to one having ordinary skill in the art at the time that the invention was made to modify Tatsuhiko per the teachings of Mizuno for the purpose of predicting and estimating loads and processing completion times and adjusting the processor clocks and supply voltages accordingly. Per claim 2, the combined references teach a lowering of the clock for the slowed processor. Per claim 3, the combined references teach a storage unit in the form of the FIFO to estimate processing times of Mizuno, with the clocks adjusted per the ratios of Tatsuhiko, as the ratios of Tatsuhiko represent the heavy/light loading of Mizuno, with resulting frequencies to be set according to estimated ratios. Per claim 4, the ratios are indirectly calculated as the loading (heavy vs. light) is a ratio which then leads to clock adjustments, as the claim does not set forth numerical specifics. Claim 5 is discussed in the analysis of Mizuno, with adjustments in the combination to be based upon which is to finish first, consistent with teachings of Tatsuhiko. Per claims 6-8, the use of the

FIFO of Mizuno and the counts of Tatsuhiko represent estimates and predictions, with attendant prediction units in the FIFO and 2, respectively, which processor will finish first, with appropriate adjustments made to the frequencies and supply voltages. Note that the adjustment of Tatsuhiko represents a trailing correction, with the counts of  $t0-1$  used for correction at  $t1$  and  $t1-2$  used for correction at  $t2$ . Thus combined, the references predict which will finish first (the more lightly loaded finishes first) based upon a previous processing time and the resulting frequencies changed accordingly. As far as the method claims are concerned, prestored estimates are represented by the FIFO and counts, with the frequencies adjusted according to the calculating ratios (i.e. a ratio can be as broad as faster vs. slower with any resulting adjustment meeting what is claimed).

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nicol et al. teach load prediction to equalize the processing load, as well as supply voltage adjustment. Tymchenko shows ratio selection from a lookup. Zdrvkovic teaches queue measurement for clock selection. Williams teaches load detection with clock adjustment. Shaffer et al. teach program based clocking with each task or program having an optimal frequency.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fritz M Fleming whose telephone number is 703-308-1483. The examiner can normally be reached on M-F, 0600-1500.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Gaffin can be reached on 703-308-3301. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Fritz M. Fleming  
Primary Examiner  
Art Unit 2182

fmf